

Constitutive model for polymers in rubber like state for thermoforming and stretch blow moulding: How to use chain statistic

*Noëlle BILLON**

Mines-Paristech CEMEF - NA - France

An innovative concept of visco hyper elastic modelling for polymers based on revisited Edward Vilgis network models will be presented. The model is described at the level of chain statistic and considers the polymer to be an upon strain dependent network. This model allows reproducing strain rate and temperature dependences thanks to the use of WLF approach. Inelastic effects are introduced through the changes in the parameters of the initial network. Model is written in a full 3D thermo dynamical approach and allows thermo mechanical coupling. Efficiency will be discussed on the basis of tensile and shearing testing performed over the range of forming and using stain field measurements. Experimental data base includes loading - unloading loops in tension and in shear as well as loading - relaxation - unloading - anti relaxation tests. This innovative model can be introduced in numerical code and models complex behaviour with a small number of parameters each keeping a physical meaning.